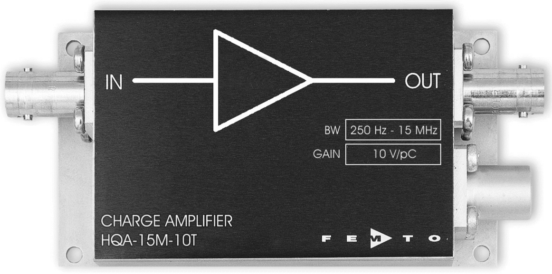
Datasheet HQA-15M-10T

High Frequency Charge Amplifier



Features

- **High Gain of 10 V/pC**
- **Wide Operating Range from 250 Hz to 15 MHz**
- **Low Input Noise of 40 x 10^{-21} C/√Hz and 700 pV/√Hz**
- **Optimized for Sinusoidal Signals from AC Coupled Charge Sources**

Applications

- **Pyro- and Piezoelectric Detectors**
- **Tuning Fork Quartz Crystals**
- **Length Extension Resonators**
- **Atomic Force Microscopy**
- **Optical Measurements**
- **Charged Particle Beam Monitoring**

Specifications	*Test Conditions*	*Vs = ±15 V, Ta = 25 °C*	
Gain	Charge Gain	10 V/pC	(@ ≥1 MΩ load)
	Equivalent Current Gain	1.6 V/µA	(@ 1 MHz sinusoidal input signal)
	Gain Accuracy	±3 %	
Bandwidth	Lower Cut-Off Frequency (–3 dB)	250 Hz	
	Upper Cut-Off Frequency (–3 dB)	15 MHz	(with max. 100 pF source capacitance)
Input	Input Impedance	1 GΩ II 10 nF	
	Effective AC Input Impedance	20 Ω	(@ 1MHz)
	Input Charge Noise	40 x 10^{-21} C/√Hz	(@ 1 MHz, with open input)
		90 x 10^{-21} C/√Hz	(@ 1 MHz, with 100 pF source capacitance)
	Equivalent Input Current Noise	250 fA/√Hz	(@ 1 MHz, with open input)
		570 fA/√Hz	(@ 1 MHz, with 100 pF source capacitance)
	Input Voltage Noise	700 pV/√Hz	(@ 1 MHz)
	Max. Input Charge	1 pCpp	
Output	Output Voltage Range	10 Vpp	(@ ≥1 MΩ load, for linear operation)
	Output Impedance	50 Ω	(terminate with ≥1 MΩ load for best performance)
	Integrated Broadband Noise	typ. 20 mVpp	
		or 3.5 mVrms	(@ ≥1 MΩ load)
Power Supply	Supply Voltage	±15 V	
	Supply Current	typ. ±35 mA	(depends on operating conditions, recommended power supply capability min. ±100 mA)

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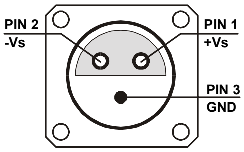
Case	Weight	200 g (0.44 lb.)
	Material	AlMg4.5Mn, nickel-plated
Temperature Range	Storage Temperature	−40 °C to +100 °C
	Operating Temperature	+20 °C to +40 °C
Absolute Maximum Ratings	Input Voltage	20 Vpp
	Power Supply Voltage	±18 V
Connectors	Input	BNC
	Output	BNC
	Power Supply	LEMO series 1S, 3-pin fixed socket Pin 1: +15V Pin 2: −15V Pin 3: GND
		

Operation

General:
The amplifier is AC coupled for direct use with a charge sensor producing sinusoidal signals with no DC background. A source capacitance of less than 1 nF is recommended for proper operation. If the effective source capacitance (sensor plus cable capacitance) is small relative to the effective input impedance of the amplifier (10 nF) the amplifier acts as a virtual ground and most of the charge flows into the amplifier input. At 1 MHz the amplifier input capacitance of 10 nF corresponds to a complex input impedance of 20 Ω. An input resistor of 1 GΩ is incorporated to prevent buildup of static charge. The amplifier is not suited for sources producing an average DC background current as this would saturate the device.

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Dimensions